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NJDOT TRAFFIC IMPACT ASSESSMENT FOR NORTH VILLAGE AT SPARTA

PROPOSED
MIXED-USE DEVELOPMENT

ROUTE 15 NORTHBOUND, MP 15.25
TOWNSHIP OF SPARTA
SUSSEX COUNTY, NEW JERSEY

SEPTEMBER 16, 2014

A handwritten signature in black ink that reads "Elizabeth Dolan".

ELIZABETH DOLAN, P.E.
NJ. LICENSE NO. 37071

A handwritten signature in black ink that reads "Gary W. Dean".

GARY W. DEAN, P.E., P.P.
NJ. LICENSE NO. 88722

INTRODUCTION

Dolan & Dean Consulting Engineers, LLC (D&D) has been commissioned by the applicant to prepare this Traffic Impact Assessment for submission to NJDOT as part of a Major Access Permit with Planning Review Application for North Village at Sparta. The primary access to the development is via the proposed Market Street. Market Street is a proposed Master Plan road that will intersect Route 15 from the east, at approximately milepost 15.25. The new intersection will be located between the Route 15 intersections with Houses Corner Road to the south, and White Lake Road/Wilson Drive to the north.

This study evaluates the anticipated changes in traffic activity associated with the development proposal at the study locations determined in the Scope of Study dated June 19, 2013, and approved by NJDOT in a letter dated October 9, 2013.

Since that time, the plans have been revised to reduce the development yield, as summarized in the following table:

TABLE I
DEVELOPMENT YIELD COMPARISON
PROPOSED NORTH VILLAGE AT SPARTA

Land Use	2013 Scope of Study	2014 Access Application
Shopping Center	210,000 SF	135,000 SF
Hotel	100 Rooms	100 Rooms
Single Family Homes	70 Units	90 Units
Apartments	82 Units	114 Units
Townhouses & Duplexes	58 Units	0 Units

This traffic study provides updated trip generation, and internal and pass-by credit calculations based on the revised development proposal.

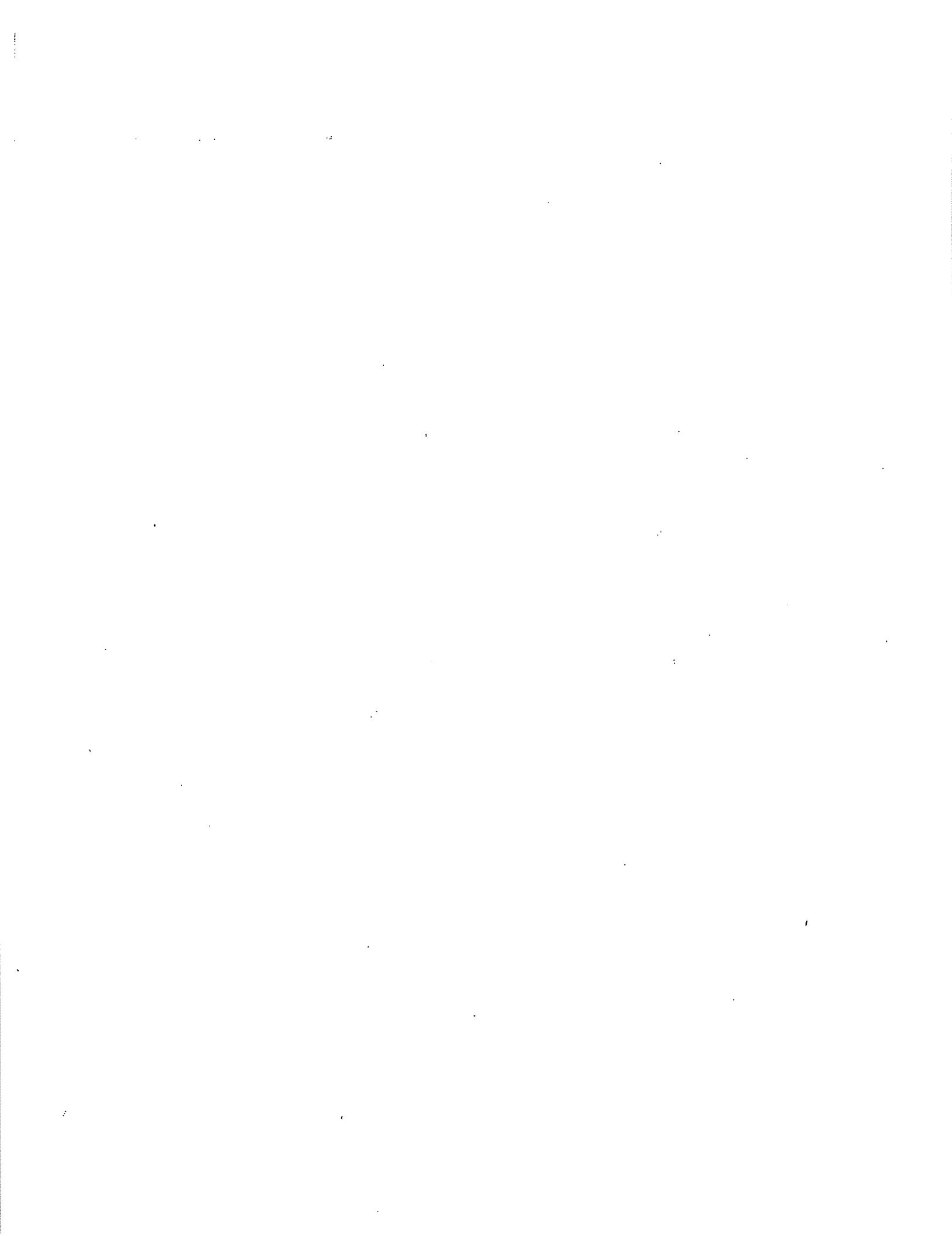


The intersections of focus are listed below, from south to north along the Route 15 corridor:

- Route 15 and Route 181/Lafayette Road
- Route 15 and Houses Corner Road
- Route 15 and White Lake Road/Wilson Drive
- Route 15 and Route 94 and Route 623/Sunset Inn Road
- Route 15 and Meadows Road

As part of this study, a signal warrant analysis has been performed for the proposed primary site access (Market Street) along Route 15.





EXISTING CONDITIONS

The subject property is located along northbound Route 15, at MP 15.25, between the intersections with Houses Corner Road to the south and White Lake Road/Wilson Drive to the north.

EXISTING ROADWAY AND INTERSECTION CONDITIONS

Route 15 is designated as a north/south Rural Arterial Principal, with a posted speed limit of 55 MPH across the site frontage. Within the study area, the speed limit changes, although the roadway generally provides one lane for each direction of travel.

Lafayette Road (Route 181) intersects Route 15 from the southeast at a signalized intersection which prohibits turns from Route 15. All motorists destined for Lafayette Road or a "U" turn must use nearside jughandles to make the appropriate turns at the traffic signal. The northbound and southbound Route 15 approaches provide two lanes for through traffic separated by a grass median. Motorists on southbound Route 15 who chose to merge onto Route 181 southbound are not processed by the traffic signal.

Houses Corner Road intersects Route 15 at a 4-leg signalized intersection. Each approach provides an exclusive left turn lane as well as a shared through/right turn lane.

White Lake Road and Wilson Drive intersect Route 15 at a signalized intersection which has recently been realigned to correct the offset geometry. The current alignment is a standard 4-leg signalized intersection. All approaches provide exclusive left turn lanes as well as shared through/right turn lanes.

Route 94 and Route 623/Sunset Inn Road intersect Route 15 in a 4-leg signalized intersection. The southbound Route 15 approach provides an exclusive through lane and a shared through and right turn lane; a far side jughandle is present for motorists who wish to make a left onto northbound Route 94. Northbound Route 15 provides a channelized right



turn lane and a left turn/through lane. The Route 628/Sunset Inn Road approach provides a shared through and left turn lane as well as a shared through and right turn lane. The fourth leg formed by southbound Route 94 provides an exclusive right turn lane as well as a shared through and left turn lane.

Route 15 and Meadows Road (Route 659) intersect to form a 4-leg signalized intersection. All approaches provide one lane for through and turning movements.

EXISTING TRAFFIC VOLUMES

As detailed in our June 19, 2013 Scope of Study Analysis, analysis of site traffic impacts are required at various intersections along the Route 15 corridor. Analysis of both the Saturday and evening peak hour is required. Accordingly, D&D performed the following traffic counts:

- Tuesday, June 11, 2013 from 4:00 p.m. to 6:30 p.m. -Route 15 and Lafayette Road
- Saturday, June 8, 2013 from 11:00 a.m. to 2:00 p.m. -Route 15 and Lafayette Road
- Wednesday, May 22, 2013 from 4:00 p.m. to 6:30 p.m. -Route 15 and Houses Corner Road
- Saturday, May 18, 2013 from 11:00 a.m. to 2:00 p.m. -Route 15 and Houses Corner Road
- Tuesday, June 11, 2013 from 4:00 p.m. to 6:30 p.m. -Route 15 and Wilson/Lake Road
- Saturday, June 8, 2013 from 11:00 a.m. to 2:00 p.m. -Route 15 and Wilson/Lake Road
- Tuesday, June 4, 2013 from 4:00 p.m. to 6:30 p.m. -Route 15 and Sunset Inn Road
- Saturday, June 1, 2013 from 11:00 a.m. to 2:00 p.m. -Route 15 and Sunset Inn Road
- Tuesday, May 21, 2013 from 4:00 p.m. to 6:30 p.m. -Route 15 and Meadows Road/Morris Farm Road
- Saturday, May 18, 2013 from 11:00 a.m. to 2:00 p.m. -Route 15 and Meadows Road/Morris Farm Road

The counts are contained in Appendix A, along with the NJDOT signal timing directives.



TRIP GENERATION

A detailed trip generation analysis was performed using industry standard data compiled by the Institute of Transportation Engineers (ITE) in the 9th Edition of Trip Generation, 2012. Specifically, data for ITE land use categories "Single-Family Homes", "Apartments," "Shopping Center", and "Hotel" were used. Table II illustrates the trip generation for the proposed uses based on ITE data.

TABLE II
ITE TRIP GENERATION
PROPOSED NORTH VILLAGE AT SPARTA

Land Use	Evening Peak Hour		Saturday Peak Hour	
	Enter	Exit	Enter	Exit
135,000 SF Shopping Center	350	378	550	508
100 Room Hotel	30	30	36	36
90 Single Family Homes	56	34	46	38
114 Apartments	46	24	30	30
Total	482	466	662	612

After the trip generation associated with the four site components was calculated, internal, "linked" volumes that travel among the uses and remain on-site were then determined using the ITE methodology for a multi-use development. Data provided in the NCHRP Report 684 "Enhancing Internal Trip Capture Estimation for Mixed-use Developments" prepared for the Transportation Research Board was also used.

After the external trips generated by the site were determined, pass-by rates were applied to determine the "new" traffic generation of the proposed development. Pass-by rates were only applied to the shopping center component of the development for the evening and Saturday peak hours.



Based on ITE data, a 36% pass-by rate was used for the evening and Saturday peak hours.

Table III illustrates the new and pass-by trips generated by the proposed site.

TABLE III
EVENING AND SATURDAY PEAK STREET HOUR TRIP GENERATION

Use	Trip Type	Evening		Saturday	
		Enter	Exit	Enter	Exit
Total Site	New	283	267	408	358
	Pass-By	116	116	176	176
	Total	399	383	589	534

Site generated traffic has been distributed according to the Gravity Model Analysis contained in our June 19, 2013 report. The Trip Generation and traffic volume worksheets are contained in Appendix B.

The following table summarizes the analysis locations and periods required:

TABLE IV
STUDY LOCATIONS AND HOURS

Intersection	Evening	Saturday
Route 15 and Lafayette Road	Yes	Yes
Route 15 and Houses Corner Road	Yes	Yes
Route 15 and White Lake Road	Yes	Yes
Route 15 and Sunset Inn Road	Yes	Yes
Route 15 and Meadow Road	Yes	Yes



FUTURE TRAFFIC CONDITIONS

For this scenario, a three-year build out has been assumed. As such, existing traffic counts were expanded by 1.5% per year for a three-year period. Site generated traffic was then added to these volumes to establish the 2016 "build" volumes.

Traffic volume worksheets are contained in Appendix B.

TRAFFIC ANALYSIS

The results of the Level of Service calculations are discussed below. Printout are contained in Appendix C.

Route 15 and Route 181/Lafayette Road The additional traffic from the proposed development adds a significant amount of left turns from Lafayette Road to Route 15 northbound. The resulting increase in delay requires timing mitigation to meet the criteria. Redistributing five seconds of green time from Route 15 to the Lafayette Road approach during the evening peak hour and 8 seconds during the Saturday peak hour mitigates the additional delay and results in acceptable levels of service under build conditions.

Route 15 and Houses Corner Road During the evening and Saturday peak hours, delay infractions did occur.

To satisfy the NJDOT requirements the signal's timing cycle was altered. All signals along Route 15 in the project vicinity operate at 120-second cycle. However, this intersection has a 150-second cycle. To mitigate the impacts, the cycle can be changed to 120 seconds to match the adjacent intersections.

Route 15 and White Lake Road/Wilson Drive The subject intersection and its relative location to the proposed development will accommodate a fair percentage of new site traffic. Therefore this intersection requires analysis. To meet the level of service degradation criteria, the theoretical mitigation includes an additional northbound lane on Route 15. This provides substantially more roadway capacity than is needed for the site. The plan sets include a conceptual design of this theoretical improvement. If this mitigation and design is acceptable to NJDOT, a fair share calculation and cost estimate will be provided upon review and approval.

Route 15 and Route 94 and Route 623 Currently there are delays at this intersection as a result of heavy traffic volumes originating on all approaches. Heavy turn volumes being opposed by heavy through volumes result in Levels of Service F under existing and no build conditions. Additionally a far side jughandle causes a large portion of traffic to be processed through the intersection two times, first as southbound Route 15 traffic and then again on Route 623 towards Route 94.

To mitigate the delays, intersection modifications are required. The theoretical intersection improvements include the northbound Route 15 approach re-striped to allow a second through lane to accommodate the high through volumes. Additionally, a second receiving lane is to be striped by utilizing the shoulder and the existing right-of-way.

If this conceptual mitigation is agreeable to NJDOT, a cost estimate and fair share calculations will be provided.

Route 15 and Route 659/Meadows Road Due to the relative distance of the intersection from the proposed development, there will not be any significant impact to the intersection operations. This intersection does not require any mitigation.



TRAFFIC SIGNAL WARRANT ANALYSIS

The application proposes the construction of a new roadway. Market Street will originate at White Lake Road and proceed through the development then turn west toward Route 15. Although the new mixed-use development will have alternative access along White Lake Road, the majority of traffic is expected to use the Route 15 and Market Street intersection. Moreover, Market Street is a Master Plan road that is expected to align with another Master Plan road on the west side of Route 15. A traffic signal is therefore proposed at the new intersection. To justify the signal, a warrant analysis has been performed following the guidelines presented in the Manual on Uniform Traffic Control Devices (MUTCD). Note that only the currently proposed three-leg intersection is being evaluated.

Appended to this report is 2009 hourly count data, collected by NJDOT between Houses Corner Road and White Lake Road on Route 15. The 2009 evening peak hour volumes on Route 15 are comparable (15 vehicle difference) to our 2013 evening peak hour volume. As such, the 2009 data is used in this Warrant Analysis. See Appendix D.

ITE hourly "Shopping Center" data was used along with the gravity model distribution to determine the minor approach (site access) volumes. The hourly trip generation calculations are also contained in Appendix D.

The volumes presented in Table V below reflect existing hourly traffic volumes on Route 15, as well as site generated traffic on the Market Street approach to Route 15. The table also summarizes which MUTCD volume warrants met.

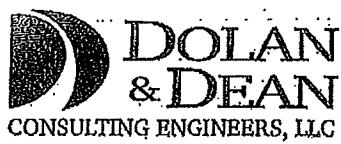


TABLE V
INTERSECTION APPROACH VOLUMES & MUTCD TRAFFIC SIGNAL WARRANT EVALUATION

Hour	NJ Route 15 (Major Road)			Proposed Market Street (Minor Road)	MUTCD Warrants Met
	Northbound	Southbound	Total	Total	
10:00-11:00 a.m.	615	791	1,406	82	1,2,3
11:00-12:00 p.m.	601	718	1,319	118	1,2,3
12:00 - 1:00 p.m.	699	742	1,441	157	1,2,3
1:00 - 2:00 p.m.	749	720	1,469	163	1,2,3
2:00 - 3:00 p.m.	865	728	1,593	169	1,2,3
3:00 - 4:00 p.m.	1,085	854	1,889	167	1,2,3
4:00 - 5:00 p.m.	1,066	757	1,823	169	1,2,3
5:00 - 6:00 p.m.	1,111	784	1,895	174	1,2,3
6:00 - 7:00 p.m.	1,095	566	1,661	142	1,2,3
7:00 - 8:00 p.m.	764	965	1,229	137	1,2,3

The intersection lane configuration has been determined through the level of service calculations contained in Appendix C. The proposed design will incorporate an exclusive left turn lane on the southbound Route 15 approach. The Market Street approach will also provide an exclusive left turn lane. The northbound Route 15 approach will provide a through lane and a right turn lane.

APPENDIX A
TRAFFIC COUNTS AND SIGNAL TIMING



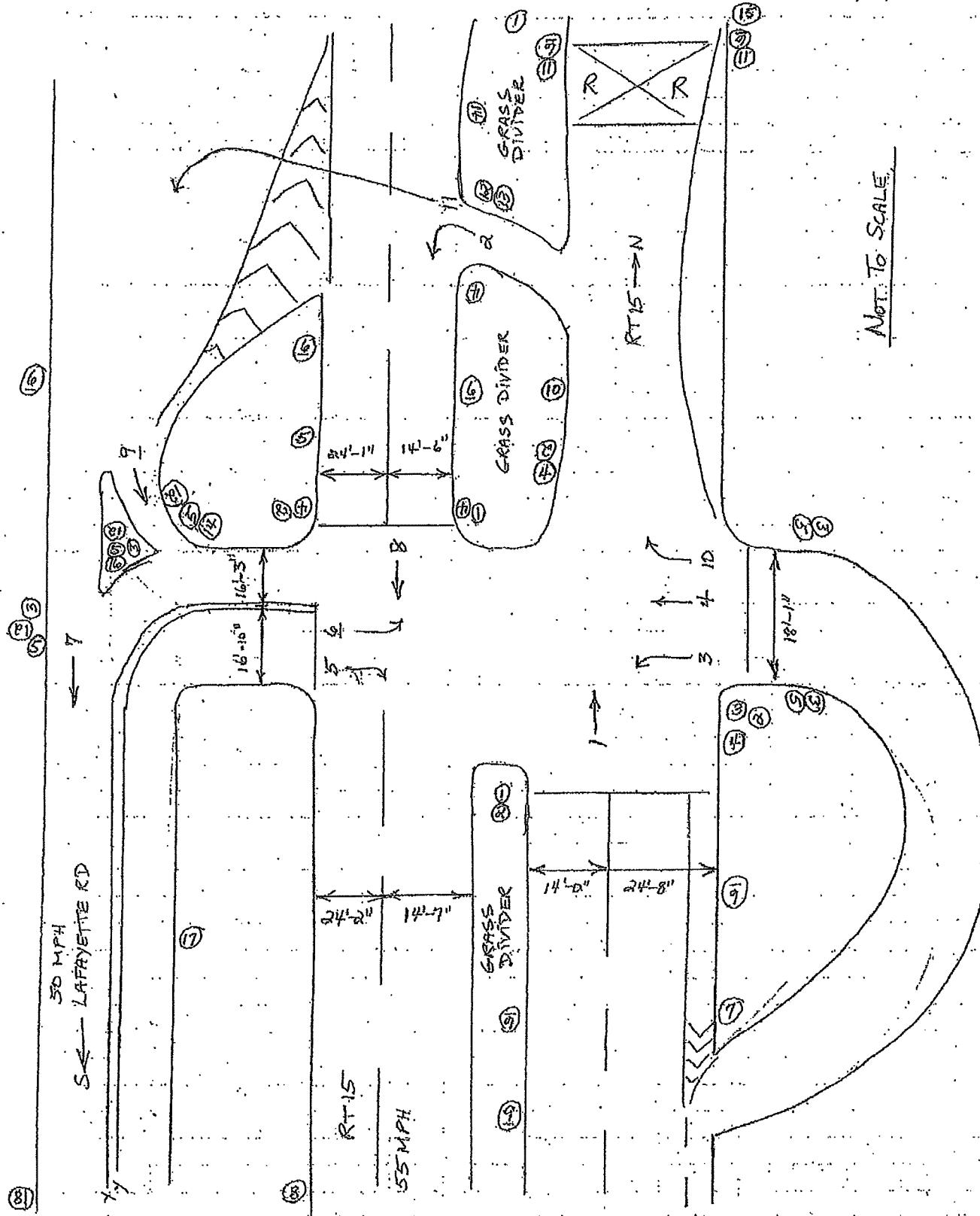
BY KEN DONATELLI

PROJECT NO. 13040

CLIENT/PROJECT RT 15 # LAFAYETTE RD

SUBJECT DYKSTRA NORTH VILLAGE

DATE 6/11/13





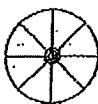
TRAFFIC SURVEY SHEET



**DOLAN
& DEAN
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INDICATE
NORTH
BY
ARROW



PROJECT #: 13040 CLIENT: NORTH VILLAGE
INTERSECTION: RT 15 & LAFAYETTE RD
MUNICIPALITY: SPARTA
COUNT BY: K. DONATELLI DATE: 6/11/13
TIME from 4:00P to 6:30P S M T W T F S
(CIRCLE DAY)

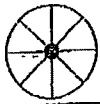
SKETCH SURVEY AREA (INCLUDE LANDMARK(S)) : CARS

TRAFFIC SURVEY SHEET



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& DEAN
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INDICATE
NORTH
BY
ARROW

PROJECT #: 1304-0 CLIENT: NORTH VILLAGE

INTERSECTION: RT 15 & LAFAYETTE RD

MUNICIPALITY: SPARTA

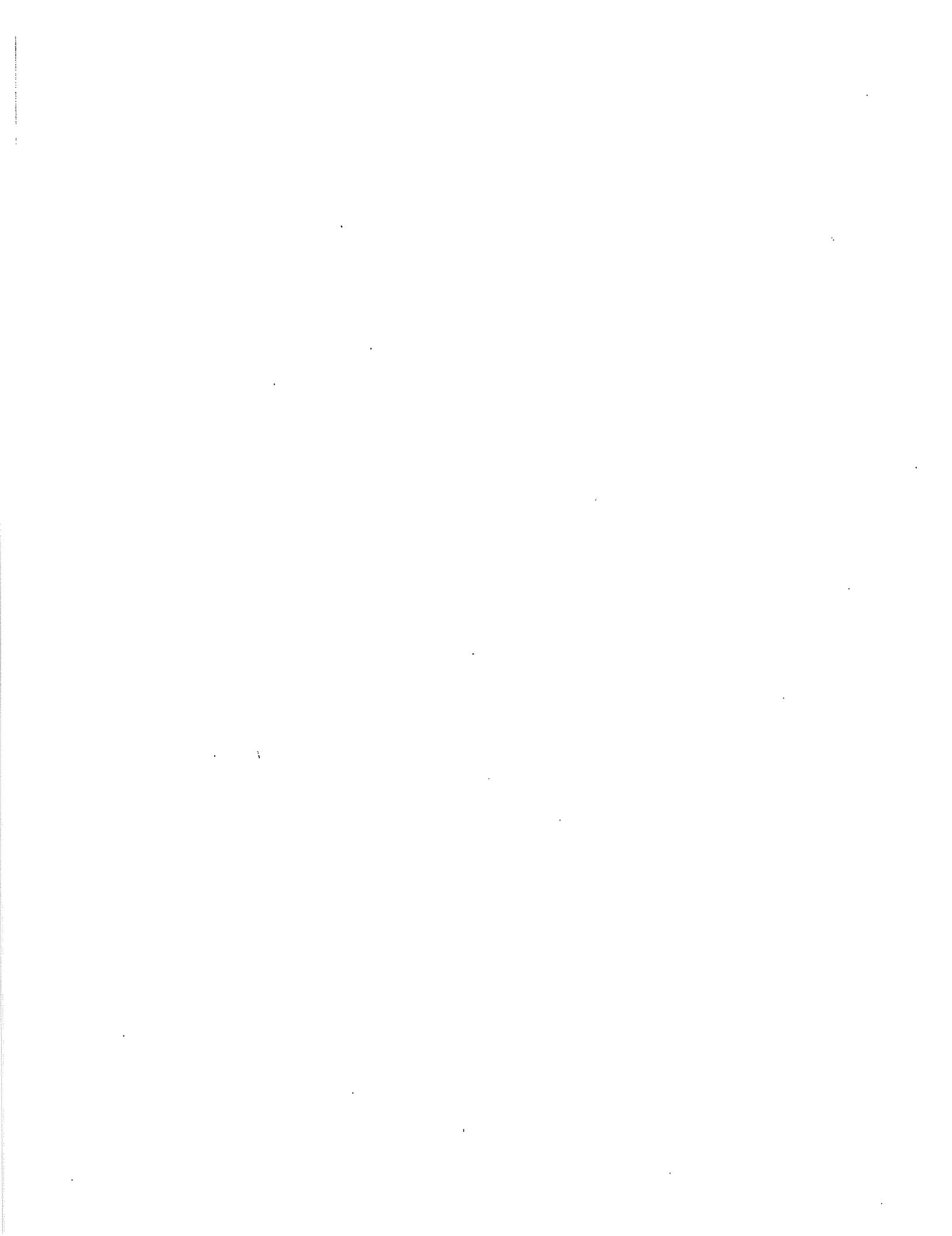
COUNT BY: K. DONATELLI DATE: 6/8/13

TIME from 11⁰⁰ to 12⁰⁰

S M T W T F S
(CIRCLE DAY)

SKETCH SURVEY AREA (INCLUDE LANDMARKS) CARS

START TIME	CARS							MOVEMENT NUMBER							TRUCKS						
	1	2	3	4	5	6	7	8	1	2	3	4	5	6	7	8	9	10			
1100	181	—	—	—	—	55	62	149	6	—	—	1	—	3	2	2	—				
1115	191	—	—	4	1	48	63	163	3	—	—	—	—	2	2	4	—				
1130	195	—	—	4	3	65	58	145	4	—	—	—	—	3	3	4	—				
1145	194	—	2	3	3	77	97	156	4	—	—	—	—	1	1	8	3				
1200	176	1	—	5	1	57	77	126	5	—	—	—	—	2	1	2	—				
1215	191	—	—	2	2	64	57	169	6	—	—	—	—	1	2	6	—				
1230	198	1	—	1	5	42	54	143	4	—	—	—	—	1	2	4	1				
1245	182	—	1	4	1	45	67	151	3	—	—	—	—	2	3	4	—				
1300	189	2	1	2	—	58	81	133	3	—	—	—	—	1	1	1	—				
1315	193	1	—	7	—	41	57	163	3	—	—	—	—	—	2	—	1				
1330	186	—	1	—	3	47	67	165	5	—	—	—	—	3	2	2	1				
1345	155	—	—	1	1	39	70	163	3	—	—	—	—	1	5	—	1				



Wed

House corner Rd. E & W - Cars & Trucks

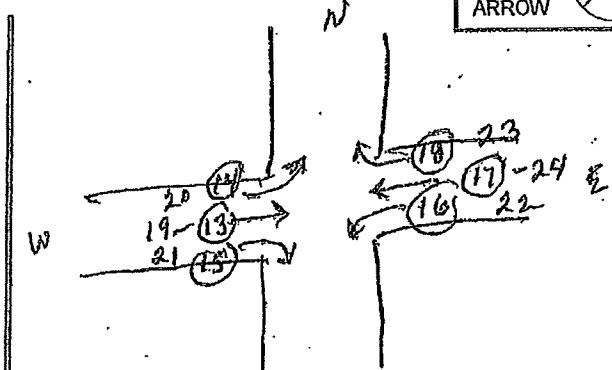
TRAFFIC SURVEY SHEET



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D. L. Stewart

PROJECT #: 13040 CLIENT: North Village
INTERSECTION: Rr 17 & House corner RD
MUNICIPALITY: Sparta - Sussex

TIME from 4 pm to 6:30 pm S M T (W) T F S
(CIRCLE DAY)



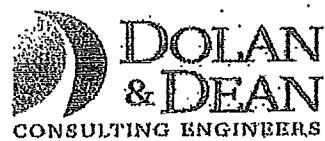
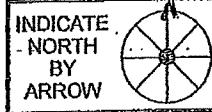
INDICATE
NORTH
BY
ARROW

SKETCH SURVEY AREA (INCLUDE LANDMARKS)

WED

Rt. 15 CARS/TRUCKS N & S

TRAFFIC SURVEY SHEET



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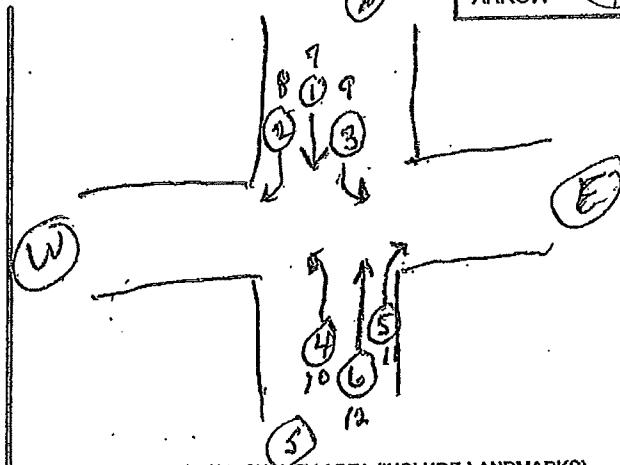
DOLAN & DEAN

PROJECT #: 13040 CLIENT: North Village

INTERSECTION: Rt. 15 & House corner Rd.

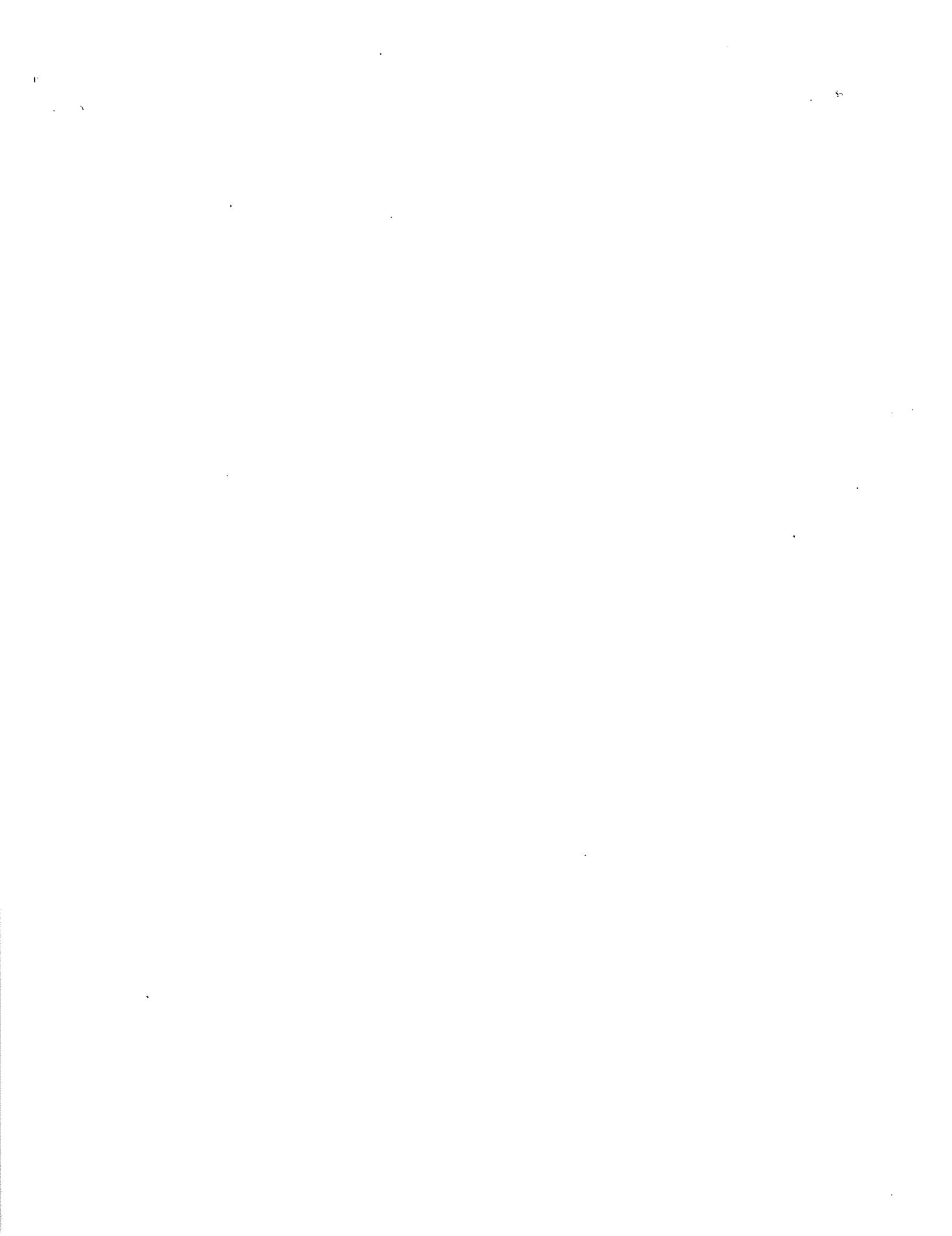
MUNICIPALITY: SPARTA - SUSSEX

COUNT BY: J. Kelly DATE: 6-22-13

TIME from 4 p to 6:30 pm S M T F S
(CIRCLE DAY)
WED

SKETCH SURVEY AREA (INCLUDE LANDMARKS)

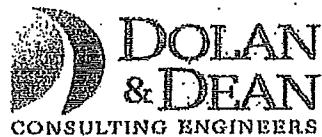
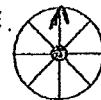
START TIME	CARS						MOVEMENT NUMBER	TRUCKS						TOTAL
	1	2	3	4	5	6		7	8	9	10	11	12	
4	143	6	2	9	11	226	397	11	1	3	2	~	13	30
4:15	150	4	8	6	13	198	385	9		1		1	2	13
4:30	163	6	4	12	7	236	432	10		1	~	7	20	452
4:45	176	7	10	16	9	266	484	7		1	2	~	9	19
5	163	6	4	9	9	226	417	1			2	5	8	425
5:15	224	6	7	12	3	242	494	5		1		9	15	509
5:30	160	4	3	10	10	269	456	4			1	3	8	464
5:45	198	6	6	7	10	238	415	10		1	1	8	20	435
6	169	5	7	9	10	255	458	8		1	1	4	14	469
6:15	159	3	4	8	6	235	415	11		1	1	10	23	438
CARS TRUCKS														
1	7						SB ON RT. 15							
2	8						SB ON RT. 15 to W ON House CORNER							
3	9						SB ON RT. 15 to E ON House CORNER							
4	10						NB ON RT. 15 to W ON House CORNER							
5	11						NB ON RT. 15 to E ON House CORNER							
6	12						NB ON RT. 15							
PEAK HOUR TOTAL														
163	63	51	98	88	2391			16	1	6	10	7	90	



RT.15 CARS/Trucks N & S

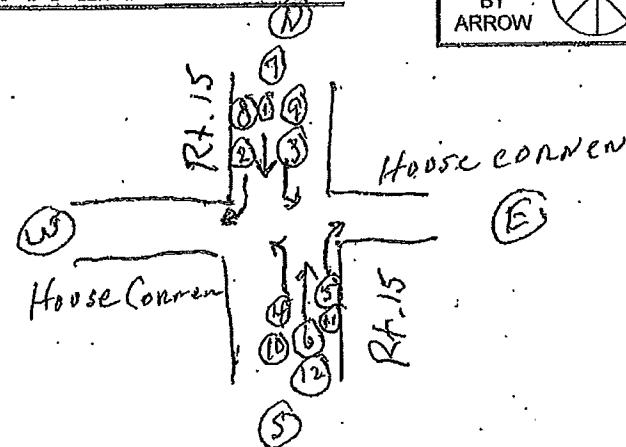
TRAFFIC SURVEY SHEET

INDICATE
NORTH
BY
ARROW



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Dykstra

PROJECT #: 13040 CLIENT: NOrth Village
INTERSECTION: RT. 17 & House corner RD
MUNICIPALITY: Sparta - Sussex
COUNT BY: J Kelly DATE: 5-18-13
TIME from 11 AM to 2 pm S M T W T F S
(CIRCLE DAY)



SKETCH SURVEY AREA (INCLUDE LANDMARKS)

START TIME	CARS RT.15						MOVEMENT NUMBER						TRUCKS RT.15						TOTAL
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16			
11	213	7	2	6	-	177	405		4		2		7	13				418	
1115	195	4	3	5	5	190	402		5		5		3	18				420	
1130	179	2	2	5	2	196	386		2		4		2	8				394	
1145	182	1	2	7	2	204	398		4		2	1	2	6	15			413	
12	189	4	11	4	7	215	430		6		1		3	10				440	
1215	218	4	4	4	6	244	480		5		1	2	4	12				492	
1230	150	3	4	12	9	239	417		1		-		5	6				423	
1245	182	2	6	8	10	278	486		3	1	1	1	6	12				498	
1	225	5	7	12	19	240	508		-				13	13				521	
115	194	1	4	6	5	219	429		2				7	9				438	
130	238	1	1	12	8	235	495		6		3	2	7	18				513	
145	125	4	7	1	5	203	395		1	1	2	1	1	6				401	
Cars & Trucks																			
#1	17	5	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
2	8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
3	9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
4	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
5	11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
6	12	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
PEAK HOUR TOTAL	2148	39	53	82	18	440			39	2	5	18	7	64					

House corner Rd cars/trucks E & W.

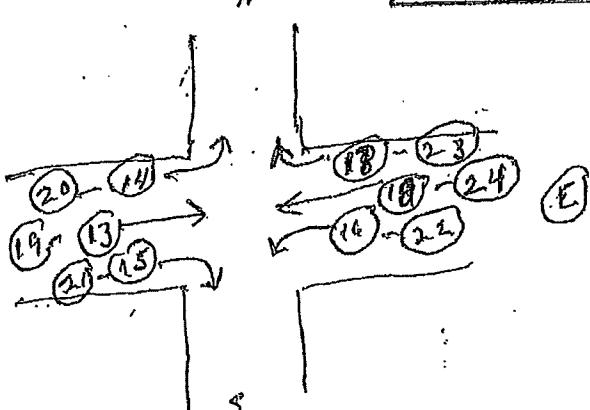
TRAFFIC SURVEY SHEET



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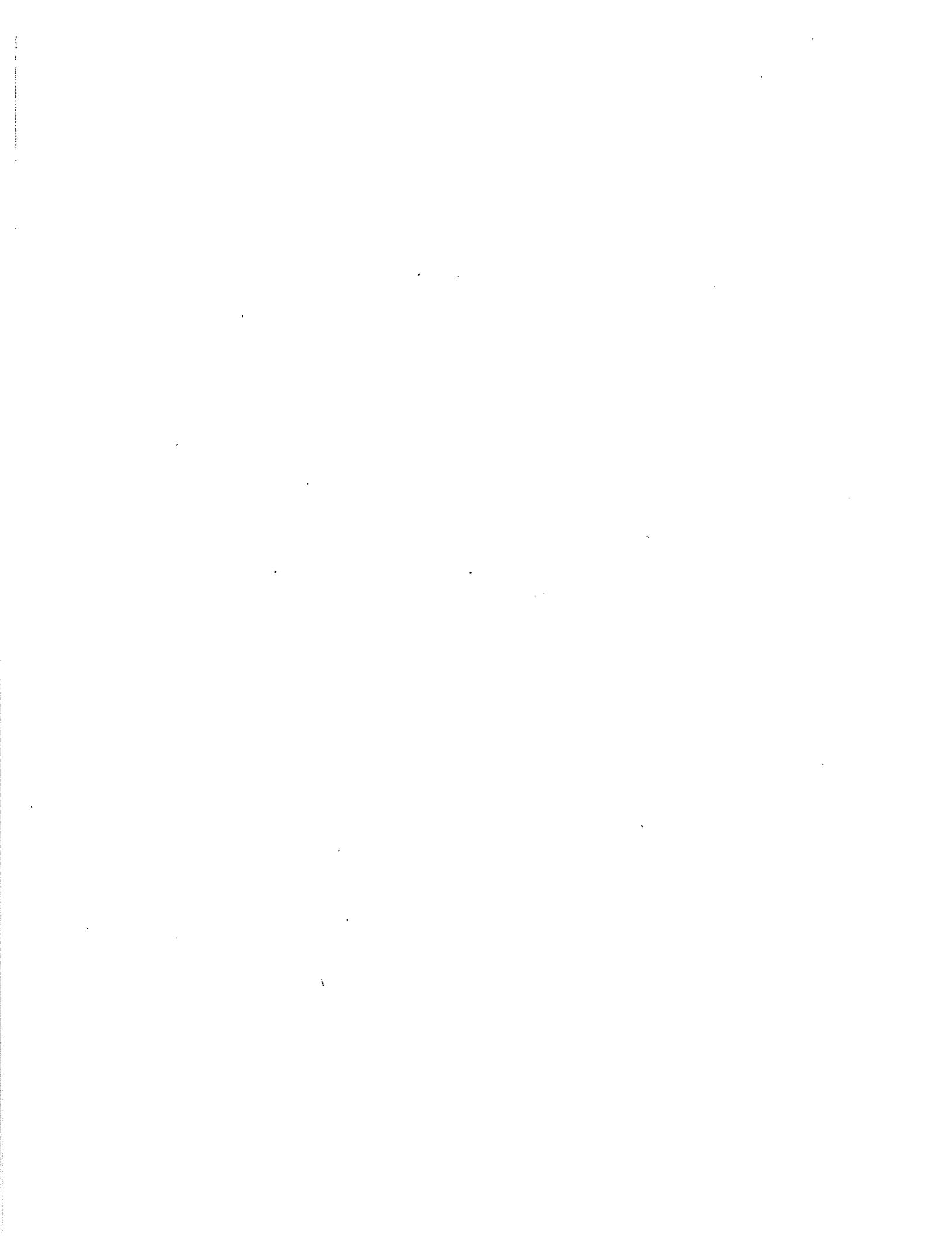
PROJECT #: 13040 CLIENT: North Village
INTERSECTION: House Corner Rd & Rt. 15
MUNICIPALITY: Sparta - Sussex
COUNT BY: Kelly DATE: 5-18-13

TIME from 11a to 2pm S M T W T F S
(CIRCLE DAY) S



SKETCH SURVEY AREA (INCLUDE LANDMARKS)

START TIME	MOVEMENT NUMBER										TRUCKS					TOTAL
	CARS					TRUCKS					CARS					
	13	14	15	16	17	18	18PM	19	20	21	22	23	24	Total		
11	6	5	8	12	6	11	48				1	1	1	3	51	
1115	9	8	13	16	5	13	64				1	2	3		67	
1130	6	5	6	5	4	2	28							-	28	
1145	4	-	10	8	12	5	39			2	1	2	1	6	45	
12	3	3	13	8	6	3	36			1				1	37	
1215	1	2	2	3	4	4	16				1	1		2	18	
1230	3	1	5	9	8	9	35				2	1	3		38	
1245	8	1	6	11	8	9	43						-		43	
1	-	3	9	8	7	3	30			1	2	1	4		34	
115	8	8	13	15	8	3	55						-		55	
130	5	4	6	8	5	2	30			1			1		31	
145	4	3	2	4	6	2	21			1			1		22	
CARS TRUCKS																
13	19	EB	ON	House corner Rd												
14	20	EB	ON	House corner to N on Rt. 15												
15	21	EB	ON	House corner to S on Rt. 15												
16	22	WB	ON	House corner to S on Rt. 15												
17	23	WB	ON	House corner to N on Rt. 15												
18	24	WB	ON	House corner												
PEAK HOUR TOTAL	51	43	93	107	79	66					6	6	9	3		



15 Wilson and White Lake

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